DDI-Heat Exchangers Inc

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From: Erwin Schwartz

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Date:	20/12/2005	**Pages:**	1+19 =20

Subject: RETIFIED BRIEF for Application 08/418,286

Dear Mr. Scherbel.

Please find attached the Retified Brief.
Signetures are on pages 1, 11, 17

Thanks very much for your help

Erwin Schwartz / B. Eng.
President

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DDI (since 1980)
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22 August 2004

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To: Commissioner for Patents
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Alexandria, VA 22313-1450 U.S.A.

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872-9306

Patent and Trade Mark Office
Group unit: 3407
Examiner: C. Atkinson
Washington, DC , 20231

RE: Application no 08/418,286

Filed: 04/07/95

Applicants: Erwin Schwartz.
Title: Heat Exchanger,

Subject: Response to petition under 37 C.F.R. & 1.137(b) being **GRANTED.**
Dated June 23 2004.

I Include
a- Appeal Brief (in 3 copies).
b- PAYMENT of the FEE for filing the Appeal Brief.
c- NONPUBLICATION REQUEST (really was filed before publication rules changed).

Dear Sir.

I hereby shorten the application and description in order to obtain a speedy patent at least on a few of the initial claims.

Please note that some of the claims 23-42 are rewritten with more clarity, and I will refer to them as R (revised), with some modifications and additions.
And for the sake of simplicity each is given a new Number 1N, 2N etc in orther to have consecutive new numbers..

Please note that all initial drawings and figures still apply, and are not withdrawn.

Erwin Schwartz / B.Eng
Tel: 514-696-7961, Fax: 514-696-8344

And

LIPERT PETER.
Peter Lipert

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APPEAL BRIEF

(1)- Real party in interest.

Schwartz, et al.
Erwin Schwartz and Peter Lipert

(2)- Related appeals and interferences

Response to petition under 37 C.F.R. & 1.137(b) being **GRANTED.**
Dated June 23 2004.

(3)- Status of claims

Petition under 37 C.F.R. & 1.137(b) being **GRANTED.**
Dated June 23 2004.

(4)- Status of amendments

Response to petition under 37 I.E. & 1.137(b) being **GRANTED.**
Dated June 23 2004.

01/10/2006 TLUU11 00000002 08418286
01 FC:1999 165.00 OP

(5) – Summary of invention

Description of the Heat Exchanger

Line 1 - A Heat Exchanger specifically designed for Heating or Cooling of liquids Containing SOLID MATERIALS, Organic Solids and Inorganic Materials that are viscous, sticky and stingy, in such unique applications as:

a) Heating of incoming Cold Raw Sludge in Anaerobic Digesters in the Municipal Waste Water Treatment Facilities as a Hot Water-to-Sludge heater.

b) Recovery of heating energy otherwise lost from treated outgoing sludge in Anaerobic Digesters in the Municipal Waste Water Treatment Facilities as a **Sludge-to-Sludge**
Line 10 Heat Recovery Unit.

c) Heating or Cooling of Industrial Slurries as a hot water heat exchanger or a cooling unit

Refer to FIG. 1 and FIG. 2 and FIG. 7

The Heat Exchanger comprises of horizontally permanently fixed heating plates (12) to define between adjacent heating plates an area of sealed passages for two heat exchanging fluids.

The outer frame comprises of two access doors (20) and two outer walls (26). Two outer
Line 20 door frames (24) to form a permanently fixed rigid structure to provide liquid tight enclosure.
Each heating plate (12) composed of channels for conducting of the cold or hot liquid sludge **In-line and in Counter-flow** fashion.

The heating plate (12) comprises of vertical directional baffles (14) and round **solid bars** (34) attached at the end of (14), in order to reduce the risk of plugging with stringy material.

Each directional baffle (14) has a few PRESSURE RELIEF HOLES (37), or (38) or (39) in Fig. 7. The pressure relief holes has shapes of Square, Triangular of Semi-Circular.
Line 30 Each of said channel means being defined by a pair of said heating plates (12) disposed on next to the other and by a pair of directional baffles (14 and an internal return bend means (18).

The internal return bend (18) having a configuration allowing direct access to said channel, means at least at one end removable, without the necessity to dismantle the entire heat exchanger, the other end could be permanently fixed and liquid tight.

The External return bends (22) having a predetermined configuration to provide a **greater turbulence** of the liquid passing through each said channels, said external return bend being

Line 40 incorporated into and extending outwardly from said walls (26) and permanently attached to outer door frame (24). The said heat exchanger further comprising of two access doors (20) which are removable and sealed in a liquid tight fashion to allow accessibility simultaneously from two opposite directions without dismantling the entire unit, said doors being of substantially flat configuration

Line 47

We Claim.

24R -Internal return bends (18) having a predetermined configuration adapted to provide a greater flow turbulence fluid passing through each said channels (as per fig. 1 and fig. 11).

Line 50

The internal return bend (18) is a rigid continuous flat plate bent in many inward and outward **semi- hexagonal** shapes (fig. 11).

25R-The inner return bends (18) are **permanently** fixed between adjacent heating plates (12) to provide **liquid-tight conditions under high pressure for Liquid Fluid**.

29R-The inner return bend (18) can be **removable** between adjacent heating plates (12) to provide liquid-tight conditions for liquid fluid under high pressure and enable cleaning.

Line 60 **31R**-The vertical directional baffles (14) is provided with round sold **bars** (34) (fig. 2) attached at the end of (14), in order to reduce the risk of plugging with stringy materials.

32R-The EXTERNAL return bends (22) means having in cross-section of a semi-octagonal configuration in order to provide a **greater flow turbulence** of the fluid passing through.

38R-Each directional baffle (14) has a few PRESSURE RELIEF HOLES (37), (38) or (39) in fig. 7. The pressure relief holes are located at the extreme BOTTOM or Top, and have shape of Square, Triangular or Semi-Circular.

Line 70

THE PRESSURE RELIEF HOLES (ORIFICES) ALLOW the **REDUCTION OF PRESSURE** FROM BUILD UP, IN CASE OF BLOCKAGE BETWEEN ADJURING CHANNELS.
The pressure relief holes are located at the extreme of the directional baffle (14) where the liquid starts to fill up.

40R-The Inlet flanges (28) and (30) comprise a **unique transition** from **SQUARE CHANNEL to ROUND TUBE, for Liquid Fluids** adapted to connect said inlet in a special manner, which **will cause any blockage to occur outside, before or after, of the**

Line 80 **heat exchanger,** due to the reduced passage AREA of the liquid.

With added feature of possibility to put 2 Flanges, like that, in serial and connected in the narrowest side.
When the two transitions in Fig. 18 and Fig. 19 are connected together at the rectangular narrower ends, they form a natural restriction in which preferred location plugging first occurs

(6)- Issues

We hereby shorten the application and description in order to obtain a speedy patent at least on a few of the initial claims.

Please note that claims 23-42 are rewritten with more clarity, and I will refer to them as 23R- 42R (revised).

Please note that all initial drawings and figures still apply and are not withdrawn

A note of importance:

During the past several years we had been in contact with engineering experts in the field of Sludge Heating in anaerobic digestion and other applications liquids containing foreign materials. These experts agree that our unit when applicable to Recovery of Energy in the Sludge Treatment is new and unique in its application and therefore we think that the claims that we refer to should be patentable. Other existing technology, such as Spiral exchangers or Tube in Tube exchangers fail miserably in this application, due to poor design details.

We have received advice form many Professional Engineers, and have received support from Canadian and Quebec governments who both approved our project as innovative and provided assistance for R&D.

The issues are related to claims 24, 25, 29, 31, 32, 38, 40 that now are 24R, 25R, 29R, 31R, 32R, 38R, 40R claims

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We believe that **the patent of Ahlberg (priority date and international Publication date was 24 February 1984), so 20 years has passed and the patent EXPIRED.**

(And also LAPSED in
http://v3.espacenet.com/legal?DB=EPODOC&IDX=CA1309708&F=0&QPN=CA1309708 (patent LAPSED)

CA F 479214 A (Patent of invention)
PRS Date : 2003/04/08
PRS Code : MKLA
Code Expl.: - EXPIRED
EFFECTIVE DATE: 20021104

)

We believe also that **the patent of Dorazio 4,466,482 with Date of Patent Aug 21 1984 and filed Nov 27 1981 (so 20 years has passed), the patent is EXPIRED** as of 22 August 2004.

(7)- Grouping of claims-

Each claim is separate.

(8)- Arguments

Mainly For claim 24R, 25R and 29R

[redacted]

In the expired patent of Ahlberg the layers **CLAMPED** to each other. Our invention has each layer welded in 2 sides.
The patent of Ahlberg fails to disclose:
a) the flow being unique COUNTER-FLOW and **IN-LINE,**
b) also vertical and **permanently** fixed plates and internal bends and external bends being SEMI-**HEXAGONAL** shaped in order to promote greater turbulence and thus better heat transfer efficiency.

The patent of Ahlberg claims "An apparatus according to claim 1, characterized in that the **speed of the medium in bends of the duct means is variable** in relation to the speed of the medium in straight portions of the duct means".
http://patents1.ic.gc.ca/claims?patent_number=1309708&language=EN

While our invention yields **CONSTANT flow in the channels, in order to reduce pressure drop**.

The Patent of Urch 5,078,208 specify **PERMANENTLY FIXED** internal bends and this patent does not allow for **REMOVABLE bends** to get access to internals **as is our invention**.

It also allows for "SOME **LEAKAGE OF THE FLUIDS** BETWEEN THE PASSAGES MAY TAKE PLACE" (see line 10 page 1). Our Heat Exchanger does not allow ANY Leakage between the two medias, as it will contaminate the Water in the plant with SLUDGE from the other liquid.

In line 68 page 3 Urch states "Throughout the embodiments the fluid used is **GASEOUS eg. AIR**". (also page 4 line 32). Urch design could not work with LIQUIDS and further more, not with liquids with High % of Solids in them, as is our invention.

Urch unit is designed for handling Gases and it is built from METAL **FOIL** (see page 4 line 9), a rather fragile material that would fail in our application from the very start due to high pressures, and it will never work with high pressured liquid with solids in them.
(Also see page 8 line 34) "**Foil thickness of 0.05 mm. To 0.01 mm. Have been found to be adequate for carrying out the invention".**

Urch object of invention (as per page 2 line 7 and 8) is " **to provide an improved isolating heat exchanger**", it has nothing to do with our invention which **allows** for passages of liquids containing high percent solids even of abrasive nature.

Urch DOES NOT HAVE INTERNAL RETURN BENDS in the end AT ALL.

We have Internal bends in the end of each channel in order to conduct the flow of the Liquid fluid, at the end of the channels.

Urch does not have in-line and counter flow, and semi-hexagonal return bends in the LAYER it self in its channels as is in our unit, **but as an external manifolds (15, 17).**

The Examiner refers to the patent of Dorazio with regards to Semi-hexagonal configuration and Transition means. The patent of Dorazio 4,466,482 with Date of Patent Aug 21 1984 and filed Nov 27 1981 (so 20 years has passed), the patent is EXPIRED.

Also in
24R- Our design applies for FLUID **LIQUIDS, especially for liquids with high % of solids in them** and stringy materials that otherwise would block small passages.

29R- This INNER Bends are **REMOVABLE**
This allows for quick access for **Inspection and cleaning of the inside, while maintaining the possibility of high pressure flow OF LIQUIDS with stringy material in the flow.**

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31R- We have a unique design of straight directional baffle WITH ADDITIONAL LARGER DIAMETER ROUND **BAR** AT THE END, **IN ORDER TO AVOID STRINGY MATERIAL, IN SLUDGE FLOW, FROM BEING STUCK AT IT.**

It is not there to smooth out the fluid flow as in the patent by Kadle 5,111,878
(Kadle was mentioned by the Examiner).
Kadle patent is for **AIR, not for liquids.** (see Abstract).
Kadle patent refers to **TUBE**. Our design has **SQUARE CHANNELS**.
Kadle patent has **RIBS for flow of air**. Our design has no ribs.
Kadle has rounded-off **ends of a tube.** Our Design Welds a SOLID BAR in the end of a flat bar, this is completely different design, as it is a **Thicker round Bar stuck up to a smaller flat end bar** (please see our fig 34)

Kadle on page 1 lines 41-42 states "centralized divider **rib** of U –flow type tubes of an evaporator for an **air conditioner**".
Our design has no ribs, is not from tube, and not for air.

Again no one is claiming patent for a metal Bar, or a round metal, our usage of Round BAR to weld to a flat divider for Sludge liquids fluids, has nothing to do with Kadle.

32R- The **Semi Octagon shape will increase the Turbulance flow** which is beneficial for improved heat transfer.

38R-We have a unique design of PRESSURE RELIEF HOLES (ORIFICES) THAT **ALOW REDUCTION OF PRESSURE** FROM BUILD UP, IN CASE OF BLOCKAGE BETWEEN ADJOINING Channels.
It is not there to allow the main flow of gas or liquid, and **NOT FOR THE PURPOSE OF** REDUCING LARGE **TEMPERATURE DIFFERENTIALS via " Pin holes" as per the patent by Abraham (Patent # 5,323,851) and referred to by the Examiner.**.
In our case it is Pressure relief, nothing to do with Temperature.

Our pressure relief holes are **located at the VERY Bottom of the vertical dividers where the liquid starts to fill up.**
Not in the middle as in Abraham's.
Ours is not a round circle in the middle. See Fig 7.

Abraham patent is for **air cooling, (see page 1 line 2," ...to air conditioners for use on motor**

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vehicles...).
Our patent is not for air.

We do not ask for a patent for a hole in a metal. (or in the side of a channel), but for the unique Purpose, usage, benefit, innovation in this application, as described above for Fluid Liquids with high % of solids in them i.e. Sludge).

40R- Of course transitional tubes and conduits are not new.
However in our case the inlet and outlet connections merit double duty:

1- unique transition from **SQUARE CHANNEL, out to ROUND TUBE.**
2- so as to have any **blockage,** in the Channels, **before or after the Heat Exchanger."**
(to create an obstruction at the inlet connection of smaller diameter that will catch bigger solids at the entry to the heat exchanger where it can be removed with ease).

((Example: for a channel of say 3" by 6" (area 18 sq inch), there will be a tube INLET of 4" Dia (area of 12.6 inch square) connected via the **SPECIALLY designed** (by an Engineer) Inlet Flange that **will cause the sludge to be blocked in the Inlet flange, before entering the Heat Exchanger.**
For the exit side it can be wise versa to an outlet tube of 6" Dia (area of 28.3 square inch)).

The examiner refers to the patent of Dorazio (4,466,482) re transition means to connect inlet and outlet having semi-hexagonal configuration, which is NOT for the same purpose.

Dorazio,s patent is for "**GAS TO BE HEATED**", (please see the Abstract 57, or page 1 line 10 and page 2 line 42).
.And his invention is for" **CERAMIC CROSS-FLOW**" (page 1, line 4). Our invention used with **METALS** and NOT IN ....CROSS-FLOW.
His invention is NOT for BLOCKING Sludge Liquids with solids in them.
Dorazio's patent is not for transforming SQUARE CHANNEL out to ROUND TUBE for Fluid liquids.

In any case, the patent of Dorazio with Date of Patent Aug 21 1984 and filed Nov 27 1981 (so 20 years has passed), the patent has EXPIRED

Our claim is for special reducing flange that will create artificial blockage Outside of the Heat Exchanger internals to capture larger size solids which otherwise would block exchanger internals and would be much more difficult to remove.

We do not invent the circle, nor the square shape, nor the piping, but a
1- special flange that will cause any blockage to happen OUTSIDE the Heat Exchanger and **for liquid fluids.**
2- With added feature of possibility to put 2 Flanges, like that, in serial and connected in the narrowest side.

(9)- Appendix.

Claims.

Line 1 - A Heat Exchanger specifically designed for Heating or Cooling of liquids Containing SOLID MATERIALS, Organic Solids and Inorganic Materials that are viscous, sticky and stingy, in such unique applications as:

c) Heating of incoming Cold Raw Sludge in Anaerobic Digesters in the Municipal Waste Water Treatment Facilities as a Hot Water-to-Sludge heater.

d) Recovery of heating energy otherwise lost from treated outgoing sludge in Anaerobic Digesters in the Municipal Waste Water Treatment Facilities as a **Sludge-to-Sludge**
Line 10 Heat Recovery Unit.

c) Heating or Cooling of Industrial Slurries as a hot water heat exchanger or a cooling unit

Refer to FIG. 1 and FIG. 2 and FIG. 7

The Heat Exchanger comprises of horizontally permanently fixed heating plates (12) to define between adjacent heating plates an area of sealed passages for two heat exchanging fluids.

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Each directional baffle (14) has a few PRESSURE RELIEF HOLES (37), or (38) or (39) in Fig. 7. The pressure relief holes has shapes of Square, Triangular of Semi-Circular.
Line 30 Each of said channel means being defined by a pair of said heating plates (12) disposed on next to the other and by a pair of directional baffles (14 and an internal return bend means (18).

The internal return bend (18) having a configuration allowing direct access to said channel, means at least at one end removable, without the necessity to dismantle the entire heat exchanger, the other end could be permanently fixed and liquid tight.

The External return bends (22) having a predetermined configuration to provide a **greater turbulence** of the liquid passing through each said channels, said external return bend being

Line 40 incorporated into and extending outwardly from said walls (26) and permanently attached to outer door frame (24). The said heat exchanger further comprising of two access doors

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(20) which are removable and sealed in a liquid tight fashion to allow accessibility simultaneously from two opposite directions without dismantling the entire unit, said doors being of substantially flat configuration

Line 47

We Claim.

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Line 50

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Line 80 **heat exchanger,** due to the reduced passage AREA of the liquid.

With added feature of possibility to put 2 Flanges, like that, in serial and connected in the narrowest side.
When the two transitions in Fig. 18 and Fig. 19 are connected together at the rectangular narrower ends, they form a natural restriction in which preferred location plugging first occurs

Signature

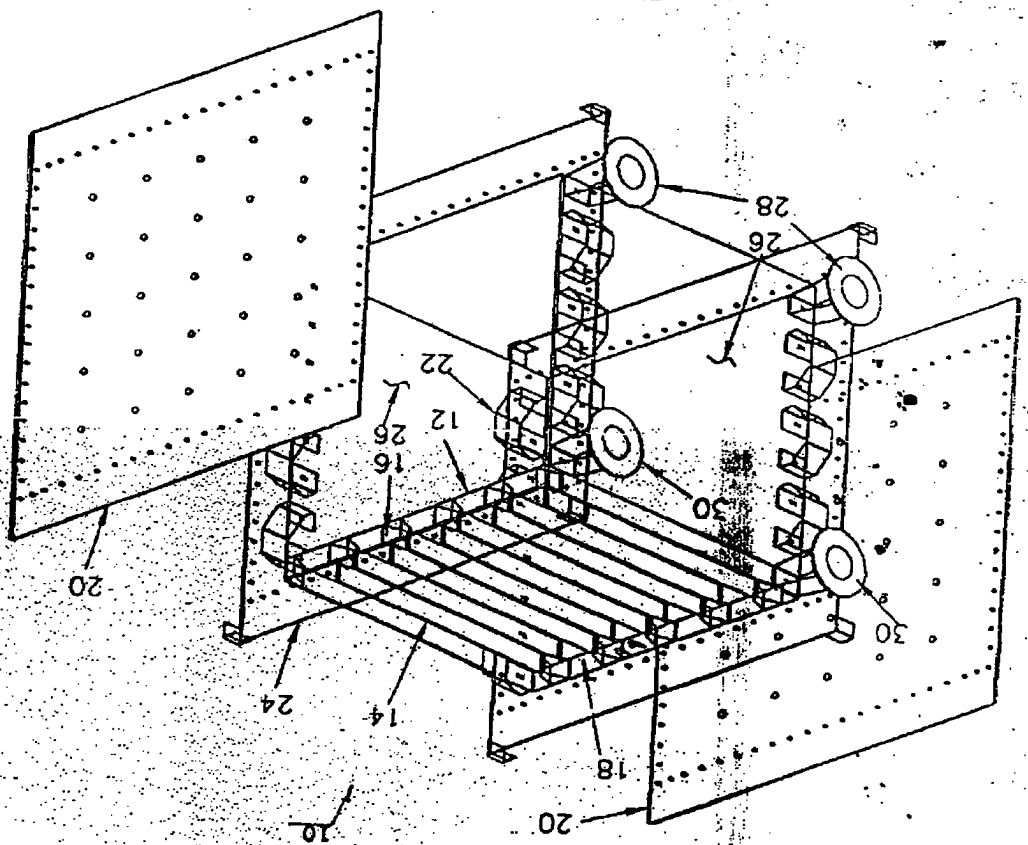

Fig. 1

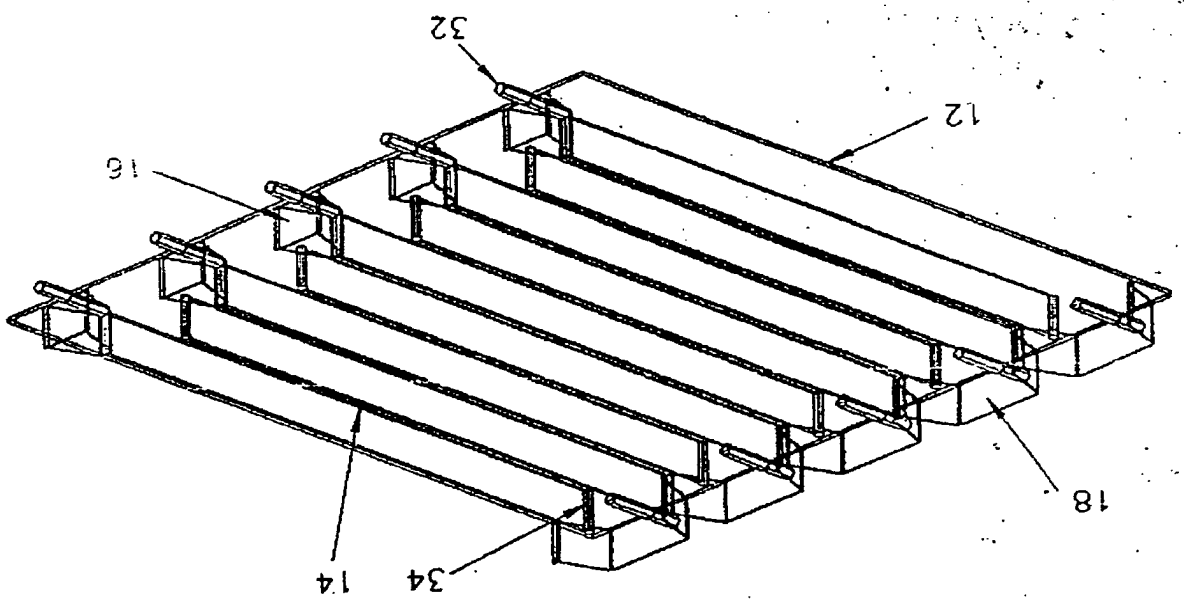

Fig. 2

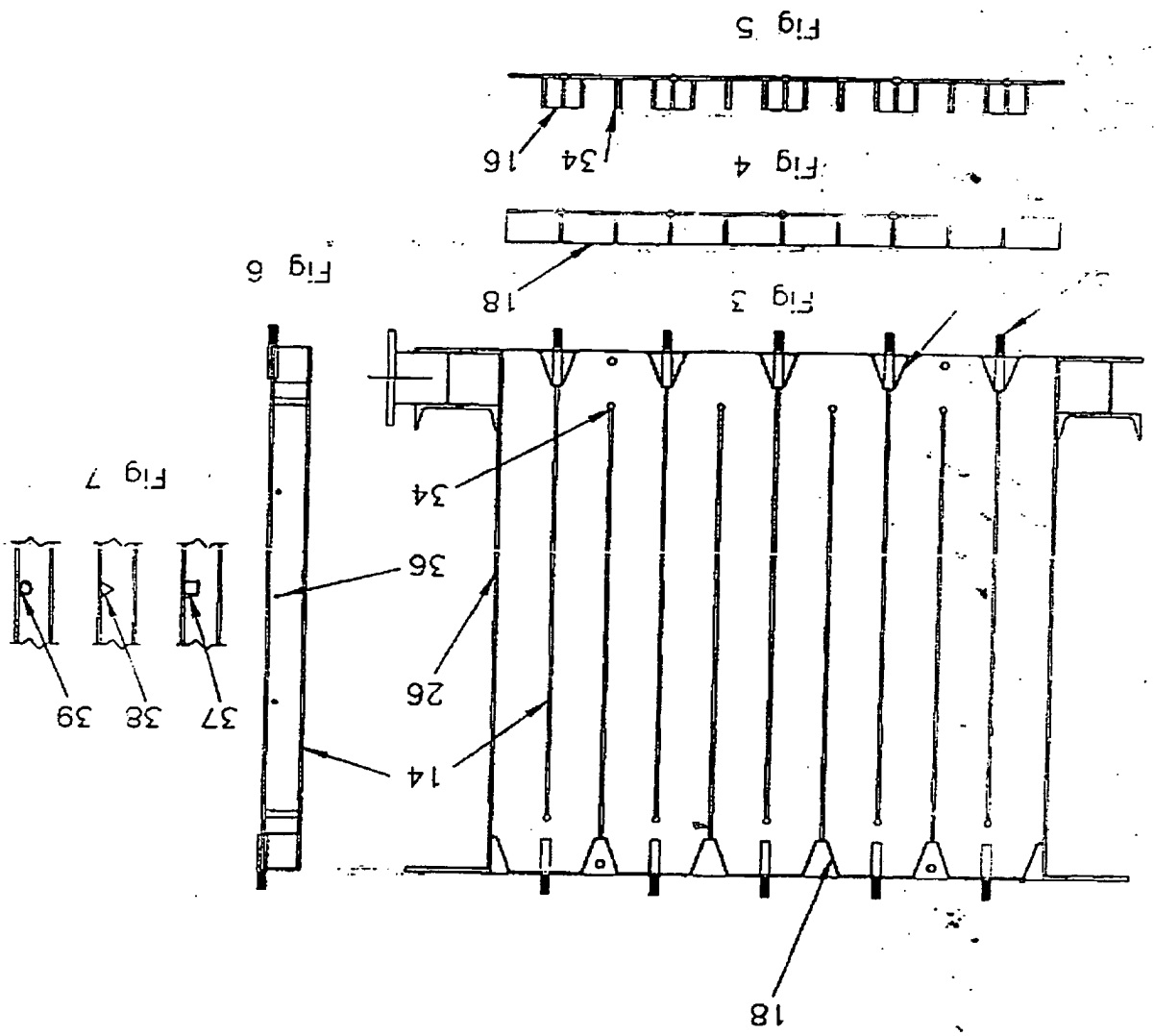
Fig 5
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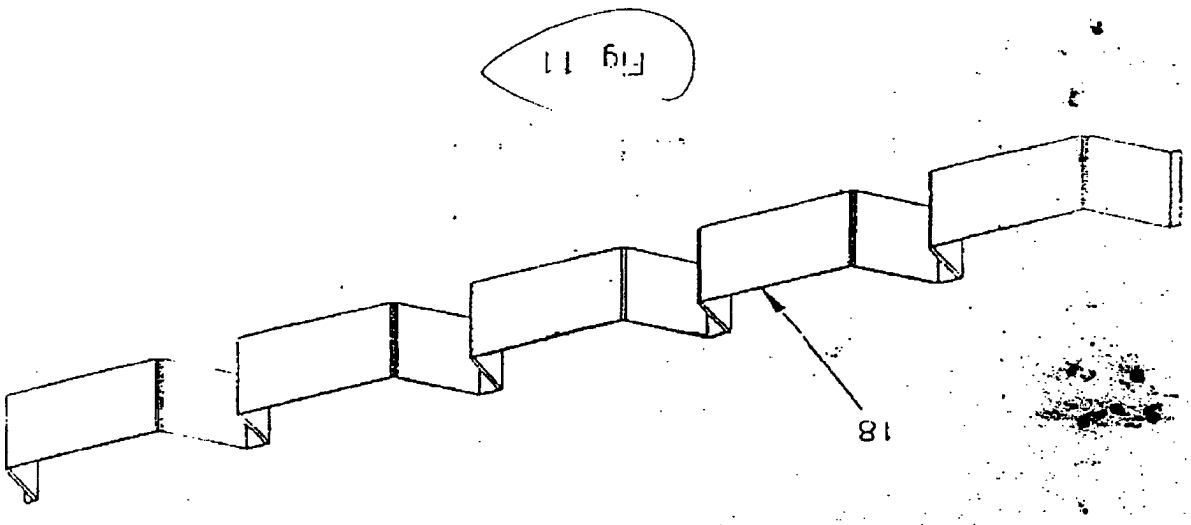

Fig 11

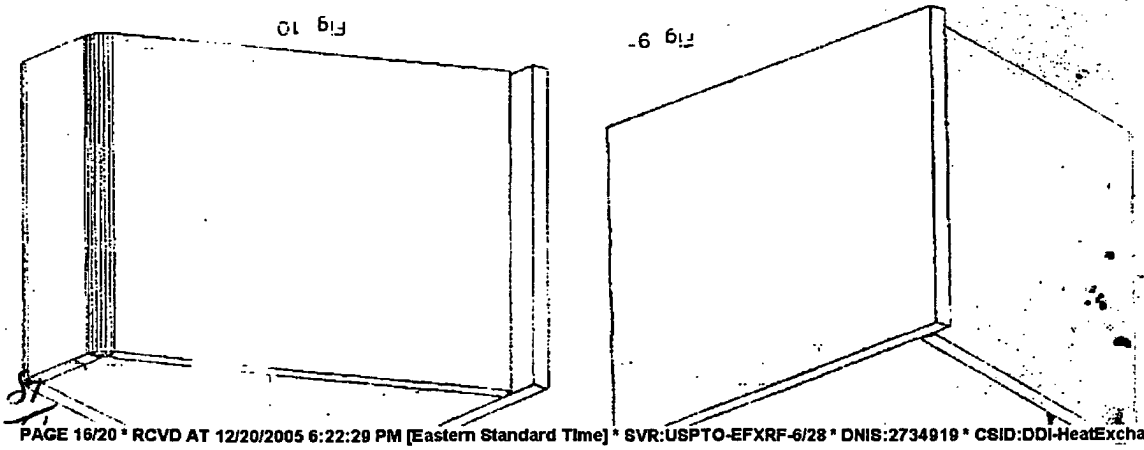

Fig 10

Fig 9

Fig 19

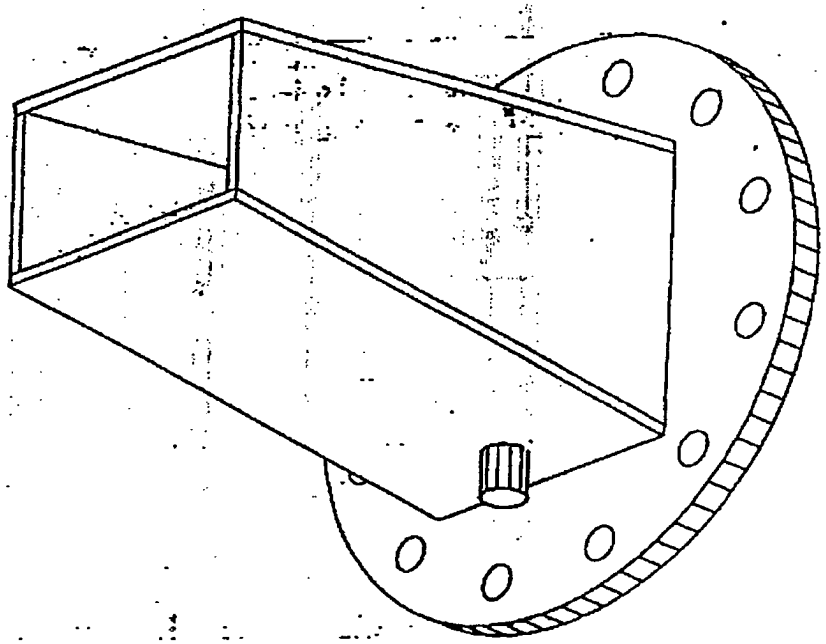

Fig 18